TOXICOLOGICAL HISTORY SOCIETY NEWSLETTER

"MITHRIDATA"

Preserving the history of poisons & the poisons of history.

Vol. XII, No. 2 **July 2002** **Issue #24**

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The ***SOCIETY*** newsletter ***"MITHRIDATA"*** is published every six months, with issues in January and July of each year.

INSTRUCTIONS FOR AUTHORS

Deadlines for receipt of materials, for inclusion in respective issues, are **December 1st**, and **June 1st**. Manuscripts of articles being submitted for publication should be sent to the Editor as clearly typed documents, accompanied by the same material in *WORD PERFECT*$^{(R)}$, or *ASCII* format, on 3.5 inch diskette readable by a personal computer running *WINDOWS 95*.

NEW MEMBERS

We would like to welcome the following new members to ***"THiS"***. Their names and interests will be added to the *2003 Directory*. Each new member is expected to contribute to the *SOCIETY* by research in their area of interests, which will lead to presentations at *SOCIETY* meetings, or articles for ***"MITHRIDATA"***.

NAME	LOCATION	INTERESTS
Jennifer Audi, MD	Boston, MASSACHUSETTS	Plant poisonings
Justo Hernandez, MD, PhD	Canary Islands, SPAIN	Renaissance toxicology
Anthony Tomassoni, MD	Portland, MAINE	Disaster preparedness
Constantinos Trompoukis, MD, PhD	Athens, GREECE	History of Toxicology
Victor Tuckler, MD	Jefferson, LOUISIANA	Historical poisons

NEWS NOTES

MITHRIDATA - THE FIRST TEN YEARS

The first ten years of our newsletter (1991-2000), covering 20 issues, have been reproduced, and bound as a single volume. To obtain a copy of the collection, please send US$15.00, to cover the cost of duplication and postage. Make checks payable to *Regional Poison Center*. This is an excellent opportunity for newer members to catch up with the past works published by our SOCIETY!

"Poisons and Antidotes Through the Ages: With Special Reference to Indian History and Mythology"

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New Delhi, INDIA

Poison has been called the coward man's weapon. Its secretive nature has held a peculiar fascination for mankind. Since earliest times the magic, myth, and legend of poison has been linked to hunting, crime, punishment, politics, romance and, of course, medicine and antidote.

Poison in Indian Mythology

Toxicology has been known from very early times in India. According to Indian mythology and tradition, the origin of poisons is attributed to *Lord Brahma*, who is one of the *Holy Trinity* of Indian Gods (The *Hindu Holy Trinity*, is comprised of *Lord Brahma*, the creator of the Universe, *Lord Vishnu*, the preserver and *Lord Shiva*, destroyer of the Universe). It is said that once the creator of the Universe was offended by a devil (*asura*) named *Kaitabha* and created poison to kill him. He was, no doubt, successful in destroying the demon with his new weapon, but its evil spread over the whole world. So much so, that to minimize its bad effects *Brahma* had to distribute it all through the vegetable, animal and mineral kingdom and also to create its antidote. *Brahma* thus distributed poisons into three categories: vegetable, animal and mineral. *Brahma* is often quoted as the first person who classified poisons like this. Later on, as we shall see, the Greek physician, Dioscorides (AD 40-90) arrived at this classification independently. One of the foremost Indian experts in the science of toxicology was Kashyapa, a physician who flourished in the times of Buddha (6th century BC). Kashyapa was a follower of the Brahmanic religion at first, but was later on converted to Buddhism. He was a successful curer of snake-bite. A very famous tale, quite possibly anecdotal, related to his curative powers is frequently narrated. King Parikshita had a curse that he would die of snake-bite, but Kashyapa had taken it upon himself to cure him when the curse befell the king. On the destined day when *Takshaka*, the king of serpents, was going to bite Parikshita, he met Kashyapa on the way and challenged him by showing his remarkable powers. It was perhaps his idea to frighten Kashyapa so that he would take back his vow. He bit a fully blossomed tree, and in front of everyone's eyes, the tree turned to ashes. But to everyone's surprise and to the shame of *Takshaka*, Kashyapa by the help of his wonderful charms and medicines restored the tree to its original blossom. Unfortunately, Kashyapa was soon *"bought over"* by *Takshaka*, and he finally succeeded in killing Parikshita by his fatal bite.

Sure enough this tale is mythological, but it does show the expertise of ancient Hindu doctors in the science of toxicology. The famous Indian surgeon Sushruta (fl: 7th century BC) defined *agadatantra*, which is very much akin to the modern term of *"toxicology"*. It dealt with the diagnosis and treatment of any person bitten by poisonous insects or venomous reptiles or affected by any natural, artificial or compound poison. Another popular Indian legend related to poisons is about *Lord Shiva* whose neck turned blue when he drank the deadly poison produced by the churning of the ocean, through which he saved the world from destruction. For this reason *Lord Shiva* is also known in India as *Neelkanth* (One with a blue throat).

Other Ancient References to poisons

The earliest of all poison recipes can be gleaned amidst Egyptian-papyrus rolls dating back to 4,500 BC, now preserved in the *Louvre Museum*. The Sumerians and Greeks administered poison for state execution. Socrates was possibly one of the earliest victims who had to drink hemlock in 399 BC. Similar cups of poison were offered to Plutarch, Midas and Themistocles, among others. With the passage of time, the knowledge and use of deadly natural compounds that went into the making of a poison became a refined art. The Bushmen of Australia are known to have perfected arrowheads that retained their poison for over a hundred years! And the Bushmen of the *Kalahari* desert use the intestine of a caterpillar for poisoning their arrows while the *Chocos* of

Colombia tipped their darts with a poison excreted from the skin of small but brilliantly-colored frogs. The frogs were stimulated to perspire and their sweat was collected like froth in which the darts were dipped. A few frogs would yield sufficient poison for over a hundred arrows! The pygmies poison their arrows with red-ant substances.

The toxicology of the Egyptians

Some of the earliest documentary accounts of poisons are to be found in ancient Egypt. Three millennia before Christ, Menes, the first of the Pharaohs, is reported to have cultivated and studied poisonous and medicinal plants and to have accumulated animal, mineral, and vegetable poisons. In *Ebers Papyrus* , there are described over 800 recipes, many containing recognizable and identified poisons-for example, hemlock, aconite, opium and some of the toxic heavy metals such as lead and antimony. Some of the pharaohs are known to have experimented with poisons, perhaps for practical matters of government and State.

Toxicology in the Greek period

The mythology and literature of classic Greek history shows a considerable knowledge of poisons, though in ancient Greece autopsies were not done. In the *Odyssey* of Homer, Helen is described as discreetly introducing into the wine of Telemachus and Menelaus, a drug that acted as a powerful anodyne. In Greek legend, *Hecate* was knowledgeable about aconite, *Medea* was familiar with the properties of *Colchicum*, and *Hercules* is said to have met his end from wearing a shirt after his wife had impregnated it with poison. The first professional treatment of toxicology begins to appear in various Greek writings in around the 3rd to 4th century BC. Thus Theophrastus, who lived from 370 to 286 BC, a pupil of Aristotle, included numerous references to poisonous plants in his work *De Historia Plantarum.* Nicander of Colophon (204-138 BC) wrote two treatises, which are the most ancient works devoted entirely to poisons. One was on snake poisons, the other on plant poisons, including opium, henbane, poisonous fungi, *Colchicum*, aconite and *Conium.* Nicander divided poisons into those that killed quickly, and those that killed slowly, and he recommended emetics in the treatment of poisoning, a recommendation which is valid even today. The Greek physician, Dioscorides (AD 40-90) classified poisons under three headings (1) animal poisons, such as cantharides, toads, snakes, *etc.*; (2) poisons from plants, including opium, *Hyoscyamus*, mandrake, hemlock, aconite, cherry laurel and yew; and (3) mineral poisons, including arsenic, copper mercury and lead. This simple classification (which according to Indian mythology and tradition was first used by *Brahma*) remained in use for many centuries and is still vaguely recognizable in modern classifications of poisons. Poisons were used by the Greeks as a means of capital punishment, the best remembered case being that of Socrates (who was made to drink from a cup of poison hemlock), and it was also used as a means of political assassination, though this use was developed on a much greater scale by the Romans subsequently. Thus started the search for antidotes for poisons. In fact it became a practical necessity if the king wished to survive in office.

Ancient Rome and its Wily Women

From simple hunting to complicated court crimes, poison was dexterously used, and women in ancient times were adept in the art of poisoning. Around the second century BC, the Roman Senate is believed to have executed over 200 such ladies, who are said to have hailed from noble families but were driven by jealousy, hatred and revenge. In those days, no value was attached to human life and people lived in perpetual fear of poisoning. This gave birth to amulet vendors who worked out charms and talismans to work as antidotes for poison. Persian Queen Parisatys (400 BC), eliminated her daughter-in-law by dexterously poisoning the knife-blade she used for carving meat for her dinner. Locusta was another mastermind in the art of poisoning. She was commissioned by Nero's mother to poison her husband Emperor Claudius (54 AD). Indeed, she received royal patronage and was appointed the State Poisoner! In pursuit of her art she was liberally offered slaves to try out her poisonous prescriptions, and keep alive her nefarious activities through a school of well trained students.

Italian Expertise

By the 16th century, Italian women were on the forefront of poisonous reputations. It is said that they even prepared poisons for sleeping persons. These women did not hesitate to poison their husbands. Toffana was one such lady who was popular in Naples for creating the perfect poison called *Aqua Toffana* or *Aquettaa-di-Napoli* which was a tasteless, colorless and odorless liquid. Six drops were enough to kill a person in a few hours. The Italians were so popular as poisoners that the British coined words like *"italianated"* or *"italianation"* for secret poisonings. The French were not lagging far behind in the world of poisons. The raving beauty of Marie Madeleine D'Aubray overtook all suspicions of her brute poisoning which she practiced on patients in hospitals she often visited on the pretext of charity. She was finally guillotined in 1676, when she had taken several lives including that of her husband, father, two brothers and one sister, besides lovers and onlookers who stood in her way.

Scientific Toxicology in Ancient India

Indian medicine has a long history. Its earliest concepts are set out in the sacred writings called the *Vedas*, especially in the *Atharvaveda*. The date of *Atharvaveda* is not known correctly, but most scientific estimates put it in an era as far back as the 2nd millennium BC. We have seen how it was the *Brahma*, who created all poisons. The ancient system of Indian medicine called *Ayurveda*, was received by *Dhanvantari* from *Brahma*, and *Dhanvantari* was deified as the god of medicine. In later times his status was gradually reduced, until he was credited with having been an earthly king who died of snakebite. The period of *Vedic* medicine lasted until about 800 BC. The *Vedas* are rich in mentioning various herbs which are recommended for various treatments.

The golden age of Indian medicine lasted from 800 BC until about AD 1000. It was marked by the production of the medical treatises known as the *Charak-samhita* and *Sushruta-samhita*. These were written respectively by Charak, a physician and Sushruta, a surgeon. Dates of Charak and Sushruta's life are widely debated, but quite possibly they lived about four to five centuries before Christ. Charak's era is supposed to be earlier than Sushruta's. In one of his books, *Chikitsa* [which in Hindi means *"treatment"*], (chapter *xxiii*, page 29-30), Charak tells us how to identify poisonous foods. He writes: *"The food is to be thrown into fire for testing.. .. the flame becomes parti-colored like the plume of a peacock. The tongue of the flame also becomes pointed; a crackling sound is emitted and the smell of a putrid corpse is perceived....Water, milk and other drinking liquids, when mixed with poison, have blue lines printed upon"*. On the same subject, Sushruta in his book *Kalpa* (*Kalpa*, Chapter I, 27) writes: *"When poisoned food is thrown into fire, it makes crackling sound and the flame issuing therefrom is tinted like the throat of the peacock."* It may be recalled here that when *Lord Shiva* drank the deadly poison produced by the churning of the ocean, his throat turned blue, not unlike that of a peacock. A book on entirely on poisons is supposed to have been written by an ancient Indian doctor named Shanak. The date of this doctor is not correctly known, but what is known is around 830 A.D. this text was translated into Arabic. This book was known as *Kitabus-su-moom*. At one place Shanak tells us how to detect poisonous foods: *"The vapor emitted by poisoned food has the color of the throat of the peacock.. .when the food is thrown into fire, it rises high in the air, the fire makes a crackling sound as when salt deflagrates.. . the smoke has the smell of a burnt corpse."* He seems to have drawn heavily from Charak and Sushruta, but quite possibly these were his independent observations. Ancient Hindu doctors gave the characteristics of poisons as follows: (1) they are not digested but quickly destroyed in the body; (2) before getting destroyed they affect all the three humors of the body, *i.e.* they are very rapidly effective; (3) they produce dryness and heat in the body; and (4) they prove fatal in most cases. It is widely believed that it was Paracelsus (1495-1541), a Swiss physician and chemist, who first said, *"All substances are poisons. There is none, which is not. The right dose differentiates a poison and a remedy."* But very few know that in ancient India, this fact was already known. Ancient Indian doctors used a process of *"purification of poisons"* after which they could be used as remedies. This process was known as *shodhankriya*. This process was not supposed to be very elaborate. It involved boiling or macerating the poison either with milk or various kinds of urines, or water mixed with cow dung, *etc.*

call the cow in India, with a word which is synonymous with mother. All excretions of cows were considered sacred and many used in Indian medicine. It is quite possible that such processes decomposed the poisons by hydrolysis, and rendered them less toxic. Certainly their dilution in milk could have helped.

Indian Legends

In ancient India, poison was a popular weapon for eliminating kings and courtiers, for killing animals, for highway robbery and a sure way of ending one's life. It is noteworthy that Aristotle had warned Alexander during his Indian campaign to keep away from Indian beauties, as they could well be *Vishakanyas* or the poison damsels. *"Remember,"* cautioned Aristotle, *"what happened when the king of India sent you rich gifts, and among them that beautiful maiden who they fed on poison (aconite) until she was of the nature of a snake, and had I not perceived it earlier and had I not found by proof that she would be killing thee by her embrace and by her perspiration, she would have surely killed thee."* Over the years, the legend of *Vishakanyas* or the *poison damsels,* has got such a stronghold on the minds of Indian people, that it is impossible to wish it away as just poppycock. Some people even imagine that these women had teeth in their vagina, with which they could cut off the penis of the person having intercourse with them. Vaginas with such teeth are still known as *vagina dentata* (toothed vaginas). Many researchers have tried to find a rational explanation for these *poison damsels.* The most logical explanation is that these women somehow kept a bolus of deadly poison in their mouth (maybe enclosed in some gelatin like material), which was transferred to the mouth of the king during an act of prolonged kissing. Another logical explanation is that these *poison damsels* were infected with deadly venereal diseases. Strabo tells us that the practice of *Sati* (the burning of wives on the funeral pyres of their dead husbands) was introduced to prevent the poisoning of husbands. The constant fear of poison forced the nobility to use special celedon plates in the belief that if poison was mixed in the food the plate would crack instantly. Cooks were always looked upon with suspicion, and to supervise them an extremely honest and loyal officer was appointed as *Mir Bakawal* (*Master of the Imperial Kitchen*), and a Superintendent was appointed to ensure the safe packing and sealing of food till it reached the royal table. To eliminate further doubts, the food was supposed to be tasted first in the kitchen by the cooks and then re-tasted in the presence of the emperor. One of the Sultans (Mahmud Begada of Ahmedabad, 1459-1513) used to feed on poison, to ensure that it would be impossible to kill him by way of poisoning. Legend has it that his parents nourished him with traces of poison since childhood, and gradually his intake of the deadly substance was increased to the extent that if a fly settled on his head, it swelled and immediately fell dead!

The Italians

The Italians developed poisoning to a fine art and in Venice there was a *Council of Ten,* who met regularly to arrange poisoning for the State, and their written records are preserved. Victims were named, prices agreed, and contracts with poisoners recorded. When the deed was accomplished the marginal note *"Factum"* was written in the record and payments were made, sometimes in the form of a regular pension.

Moghul Tales

Babur, the founder of the Moghul empire, was lucky enough to save himself by detecting the poison which had been concealed in his *nan* (bread) by the crafty cooks of his former enemy, Ibrahim Lodi, whom he had defeated in battle. The entire operation had been planned by Ibrahim's mother, but Babur's presence of mind saved him. The cooks were cut to pieces and the queen mother was stripped of her allowances. Moghul emperors such as Shah Jehan and Akbar, eliminated various nobles and courtiers in open durbar by presenting them poisoned betel nuts. A Bundi folklore still considers Akbar guilty of poisoning Raja Man Singh. Unfortunately the pills got mixed, and Akbar swallowed those intended for the guest and thus killed himself.

Akbar was an inquisitive observer and once while hunting he observed that an arrow that had been used to kill a snake served as a powerful weapon that instantly paralyzed and killed a deer. He immediately ordered the

collection of the snake, checked its venom and then issued instructions for the formation of a department that would study poisons. Shah Jehan would keep cobras in the hollow of bamboo shoots, like the thugs of Bengal and order the execution of convicts by way of snake bite. Mahmud of Ghazni got rid of highway robbers by allowing a load of poisoned apples to be robbed which resulted in the instant death of culprits. All of which is, however, not the end of the poison story as unscrupulous elements of today's *Net* age are also not loathe to use such deadly stratagems to serve their own ends.

Antidotes through the ages

The most famous example of an antidote was that devised by King Mithridates VI. He was king of Pontus [modern day Turkey] in Asia Minor, living from 114-63 BC. The Roman scholar Pliny (AD 23-79), wrote a good deal about him. Mithridates experimented with poisons, trying them out on condemned criminals, and he also tried out various antidotes to the various poisons on these prisoners, either before they were poisoned or immediately after they were poisoned to see whether in fact the antidotes were effective. In this way he discovered various antidotes or what he considered to be antidotes against different poisons and he then compounded them all together in order to produce a universal antidote which could neutralize any poison. Adopting an overcautious approach, he then began taking this supposed universal antidote daily. It is often stated that the original recipe had more than 36 ingredients; Greek physician Galen (AD 130-200) said there were 54! Eventually Mithridates was defeated by the Roman general and statesman Pompey (106-48 BC), and holed up in his fortress; he massacred his wives, concubines and daughters and he then took poison, but, alas, protected as he was by his daily dose of his magnificent antidote, the poison failed to act. The antidote by this time was known as *Mithridatium*. Perhaps he failed to die from poison because of this antidote. He had to get his Celtic soldier servant to stab him to death with his sword. After his defeat and death, Pompey discovered Mithridates' notebooks on antidotes for poisons, and so *Mithridatium* became known in Rome. The Roman emperor Nero (AD 37-68) showed a great interest in poisons. Andromachus, one of Nero's personal physicians, improved the formula and it then became known as *Theriac of Andromachus*, containing 64 ingredients-and this included the flesh of vipers! For some strange reason, people have always thought that the flesh of vipers is a good antidote to poison. Perhaps this thought arose because the snakes are poisonous yet they do not die of their poison, so it is rather reasonable to think that the snakes' flesh acted as an antidote. Viper's flesh was a very common ingredient of any antidote that was developed in ancient times. In the course of time *Theriac* became not only an antidote against poison but also a panacea against all diseases and it was in medical use until the 18th century. To prevent fraud, in many cities, including Venice, Montpellier, Toulouse and Strasbourg, *Theriac* was carefully compounded and prepared in public under official supervision! Even today *Theriac* jars can be seen in museums. Other universal antidotes to poisons which survived for centuries in popular use were *bezoars* (stomach stones), found in certain animals, particularly ruminants and some varieties of goats. These were first used in the Middle East and they were introduced into Europe by the Arabs, who still have some faith in them in some parts of the Middle East to this present day. These stones were pulverized and put into drinks of wine to treat cases of poisoning, but small stones were also mounted and worn as amulets as a protection against poison. Another universal antidote was *Terra Sigillata*, a special clay earth from the island of *Lemnos*. To prevent fraud, this special clay was prepared in tablets and stamped with a seal, thus giving the substance its name. Later, other sources of similar earth were found in different parts of Europe and in the 16th and 17th Centuries, mugs were made of it, from which anyone could drink without fear of poisoning.

Toxicology in the modern times

The last 150 years have seen great progress in the analysis of poisons. Today, with modern techniques and instrumentation, the most minute traces of alien compounds can be detected, not only from tissues and organs collected at the time of post-mortem examination, but also in biological samples such as blood and urine collected during life. The science of antidotes has become more scientific. We have moved from the age of *Mithridatium, bezoars* and *Terra Sigillata* to the age of physiological antidotes and chelating agents. Several medical journals are devoted solely to the study of toxicology. Toxicology is taken up by several promising young students as their career. It is no longer the murky, shady, crime-infested vocation of the poisoners; instead it has become a true science pursued by brilliant investigators.

BUY - SELL - TRADE

Any *SOCIETY* members with historically related toxicology items to buy, sell, or trade, should send a list of such items to the EDITOR for inclusion in ***"MITHRIDATA"***.

WANTED: BOOKS (pre-1960) and EPHEMERA on toxicology or poisonous substances. Send title, author, date, condition and asking price to the ***"MITHRIDATA"*** Editor: John Trestrail.

CHANGE OF ADDRESS?

Please immediately notify the Editor of ***"MITHRIDATA"***, of changes in your mailing address, as the return of posted materials unnecessarily increases our level of confusion as well as our postage costs.

"THiS" SEEKS NEW MEMBERS

Please photocopy the membership form included with this newsletter, and provide it to friends and fellow professionals who would be interested in becoming a part of our *SOCIETY*.